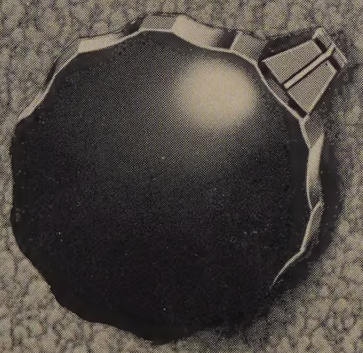
# Kepco

INSTRUCTION MANUAL

✳ VOLTAGE
REGULATED
POWER
SUPPLIES



Kepco Inc.

MODEL KSY-7510
Kepco #6312

SERIAL NO. C26656

KEPCO, INC.
131 - 38 Sanford Avenue
Flushing 55, New York

Copyright 1958
Kepco, Inc.
Flushing, New York

Digitized by the Internet Archive
in 2026

https://archive.org/details/manualsplus_12507

## STANDARD POLICY COVERING REPRODUCTION AND USE OF TECHNICAL DATA FOR KEPCO MANUFACTURED EQUIPMENT

The technical data submitted, including manuals, parts information, and mechanical and electrical drawings, is furnished solely for the purpose of effecting maintenance and/or repairs to the apparatus therein described and the purchaser or the Government shall not reproduce, use, or disclose the said technical data, in whole or in part, for any other purpose. Such technical data shall not be used for promotional procurement, development or manufacturing purposes, nor shall the purchaser or the Government permit the reproduction, use, or disclosure of any part of said technical data by others. The purchaser shall notify the Government of the purchaser's limited right in the use of said technical data for aforesaid purposes. In the event that any part of this technical data is used by anyone for other than the above-authorized purposes, the purchaser will give all assistance possible for the prosecution of action against any unauthorized use thereof.

---

# TABLE OF CONTENTS


| SECTION | PAGE NO. |
|---|---|
| A. ELECTRICAL AND PHYSICAL SPECIFICATIONS | A-1 |
| TERMINALS AND CONTROLS | A-2 |
| Remote Output Voltage Control | A-3 |
| PROGRAM TO ZERO | A-5 |
| B. THEORY OF OPERATION | B-1 |
| C. OPERATING PROCEDURES | |
| Remote Voltage Control | C-1 |
| Remote Voltage Control (PROGRAM TO ZERO) | C-2 |
| Load Current Derating Chart | C-2A |
| Current Regulated Operation | C-3 |

REFERENCE APPENDIX

Parts Lists

Parts Location Photographs

Schematic Diagrams of Power and Control Units

Catalog

SECTION A

## ELECTRICAL AND PHYSICAL SPECIFICATIONS

.....DC OUTPUT CURRENT:

0-200 milliamperes, convertible to 0-400 milliamperes or 0-600 milliamperes by adding or changing series pass tubes.

Conversion from 0-200 milliamperes to 0-400 milliamperes output is accomplished by plugging in two additional 6L6GC tubes. Conversion to 600 milliamperes operation is accomplished by removing the 6L6GC tubes and inserting four 6550 tubes.

.....DC OUTPUT VOLTAGE:

0-325 volts in five overlapping incremental steps. Continuously variable output within each step is obtained using the Fine Voltage Control. Output may be taken from the front panel pin jacks or from the terminal board on the rear of the unit.

Three of these units are capable of being series connected to obtain an output voltage of 975 volts.

.....REGULATION:

Load: 0.1% or 0.2 volt, whichever is greater, for load changes from 0 to 600 milliamperes, or 0-400 milliamperes, or 0-200 milliamperes.

Line: 0.1% or 0.2 volt, whichever is greater, for line changes from 105 to 125 volts.

.....RIPPLE VOLTAGE:

3 millivolts RMS.

.....STABILITY:

At constant temperature, constant load, and constant line voltage, drift is less than 0.1% over a period of eight hours, after a preliminary warm-up for one hour.

.....TEMPERATURE COEFFICIENT:

0.05% per °C.

.....STORAGE TEMPERATURE:

-40°C. to +85°C.

.....AMBIENT OPERATING TEMPERATURE:

-20°C. to +50°C.

.....INPUT:

105-125 volts, 50-440 CPS, single phase.

.....DIMENSIONS:

Width 19", height 3-1/2", depth 14-3/8" beyond front panel. Special AN connector protrudes 27/32" beyond the 14-3/8" depth.

.....COLOR:

Dupont, Blue Metallic #20292384.

.....CONTROL ADJUSTMENTS:

Output Voltage Controls -

(1) Voltage Range Switch -- five range bands (0-70, 70-130, 130-195, 195-255, 255-325) obtain coarse output setting. This range switch has a screwdriver slotted shaft and shaft lock.

(2) Fine Voltage Control -- provides Vernier adjustment for obtaining continuously variable voltage within each of the five bands of the

Voltage Range Switch. This fine control has a screwdriver slotted shaft and shaft lock.

.....AC OUTPUTS:

Two unregulated 6.5 volts AC outputs at 6 amperes each. Series connection obtains 13 volts center-tapped at 6 amperes. Parallel connection obtains 6.5 volts at 12 amperes. One of the 6.5 AC outputs is center-tapped. (3% additional voltage provided to compensate for voltage drops in connecting cable).

.....FUSE PROTECTION:

AC Input Fuse )
) on Front Panel
DC Output Fuse )

AC Reference Fuse on Resistor Board

DC Voltage Control Fuse on Control Unit

.....INPUT AND OUTPUT TERMINATIONS:

DC output test points (pin jacks) are available on the front panel. All terminals are isolated from the chassis. Either positive or negative terminal of the DC output may be grounded. The AC input, AC outputs, DC output and ground terminal are avilable at a Type 3102A AN connector at the rear of the unit (3102A-20-27P).

.....REMOTE DC ON-OFF CONTROL:

Two terminals available in the AN connector are provided for energizing the DC output from a remotely located switch.(See Page C-1).

.....REMOTE OUTPUT VOLTAGE CONTROL: (OHMS/VOLT)

Two terminals available in the AN connector are provided for remotely

controlling the DC output voltage within each voltage band. FOR EACH 100 OHMS CHANGE IN REMOTE CONTROL RESISTANCE THE OUTPUT VOLTAGE CHANGES ONE VOLT.

.....PROCEDURE FOR REMOTE OUTPUT VOLTAGE CONTROL: (See Page C-1).

GENERAL -

An external resistance may be connected between terminals J and K to provide a means of remotely controlling the output voltage of the power supply. A change of 100 ohms of external resistance is required for each volt of change desired within a given band of the Voltage Range Switch. The band of the Voltage Range Switch must be chosen to accommodate the desired remote voltage control range in a given operation.

STEPS -

1. The RP Control, in the Control Unit, has been factory set to provide 10 milliamperes of comparison bridge current. If for any reason it is necessary to readjust this setting, place a milliammeter across terminals 10 and 11 of TB201 (jumper removed) and adjust for 10 milliamperes.

2. Choose and set the Voltage Range Switch band appropriate to the desired range of remote output voltage control.

3. Use the Fine Voltage Control on the front panel to set the output to the lower voltage limit of the chosen band. (The upper and lower voltage limits of each band of the Voltage Range Switch are indicated on the front panel above the switch.) (CAUTION: The voltage limits specified for each band must be strictly observed for proper operation of this unit.)

. . .GENERAL:

The schematic diagrams in the rear of the Instruction Manual are used as the basis for the outline of the following material.

NOTE: Asterisked terms refer to functional nomenclature that appears on the schematics.

This power supply incorporates a series regulating DC closed loop design. The series regulating components are called "pass" elements because the full load current is "passed" by them in the main DC loop. The following block diagram demonstrates this.

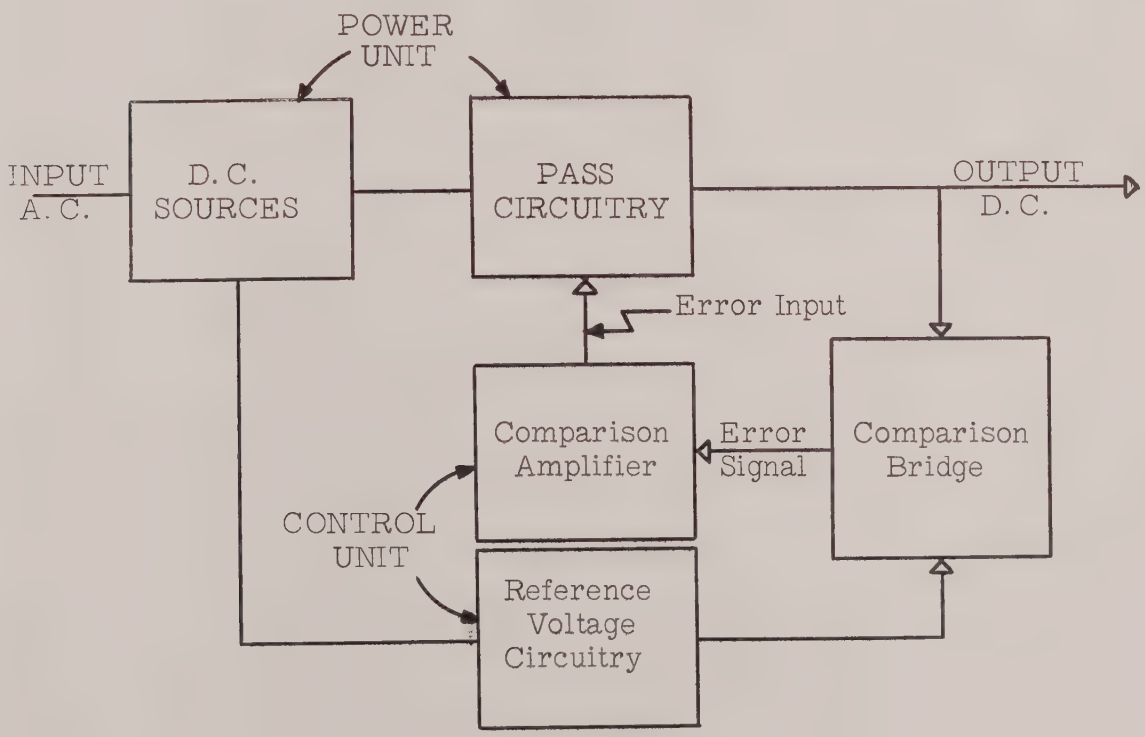



DIAGRAM B-1

It should be noted that there are two schematic diagrams corresponding respectively to the POWER UNIT* and CONTROL UNIT* shown in the block diagram. The COMPARISON BRIDGE (see Diagram B-2) discussed in the following outline under "CONTROL UNIT*", consists of elements in both POWER and CONTROL UNITS*.

.....I. POWER UNIT*

A. DC SOURCES*:

(1) MAIN PLATE SUPPLY* (full wave rectified and filtered) provides main DC for the output subject to the regulatory action of the pass circuitry. The main DC path includes the pass elements and the load in series.

(2) SCREEN SUPPLY AND PLATE BLEED* - provides a positive full-wave, highly filtered screen voltage and a minimum operating plate bleed current path.

(3) GRID DRIVER SUPPLY* - provides negative operating bias for the collector of the GRID DRIVER* in the CONTROL UNIT*.

(4) HEATER SUPPLY* - supplies PASS TUBE* heaters

B. PASS CIRCUITRY*:

The HB or "hybrid" power supply utilizes pentodes in the PASS CIRCUITRY* of what is in other respects a transistorized design. The essential regulating circuit is a DC closed loop in which the pentodes function as PASS TUBES* to effectively vary the impedance in series with the load according to a grid control signal derived continuously from the CONTROL UNIT*. This control signal is called the ERROR INPUT*.

The ERROR INPUT* is produced in a bridge circuit by a com-

parison of an output sample with a reference voltage. It is fed back degeneratively to the control grids of the PASS TUBES* to oppose the influence of line and load variations on output voltage. When functioning properly, the amount of voltage drop across the PASS TUBES* is always equal to the difference between the input voltage from the DC SOURCES* and the output voltage for which the unit has been set.

II. CONTROL UNIT*

A. REFERENCE VOLTAGE CIRCUITRY*:

The function of the REFERENCE VOLTAGE CIRCUITRY* is to maintain a precise, stable voltage for the COMPARISON BRIDGE. The reference voltage is maintained across a Zener diode stabilized by a shunting regulating transistor.

B. COMPARISON AMPLIFIER CIRCUITRY*:

(1) The COMPARISON AMPLIFIER* consists of a series of cascaded transistor amplifiers which boost the "error input" to a sufficient level to drive the PASS CIRCUITRY* in the POWER UNIT*.

(2) The COMPARISON AMPLIFIER* is connected across the COMPARISON BRIDGE from the junction of the VOLTAGE CONTROL* and the REFERENCE RESISTANCE* to the junction of the Zener reference diode and the positive output terminal. (See Diagram B-2.)

This situation is somewhat similar to that of the null galvanometer across a Wheatstone bridge. The imbalance in the COMPARISON BRIDGE is detected and amplified by the COMPARISON AMPLIFIER CIRCUITRY*.

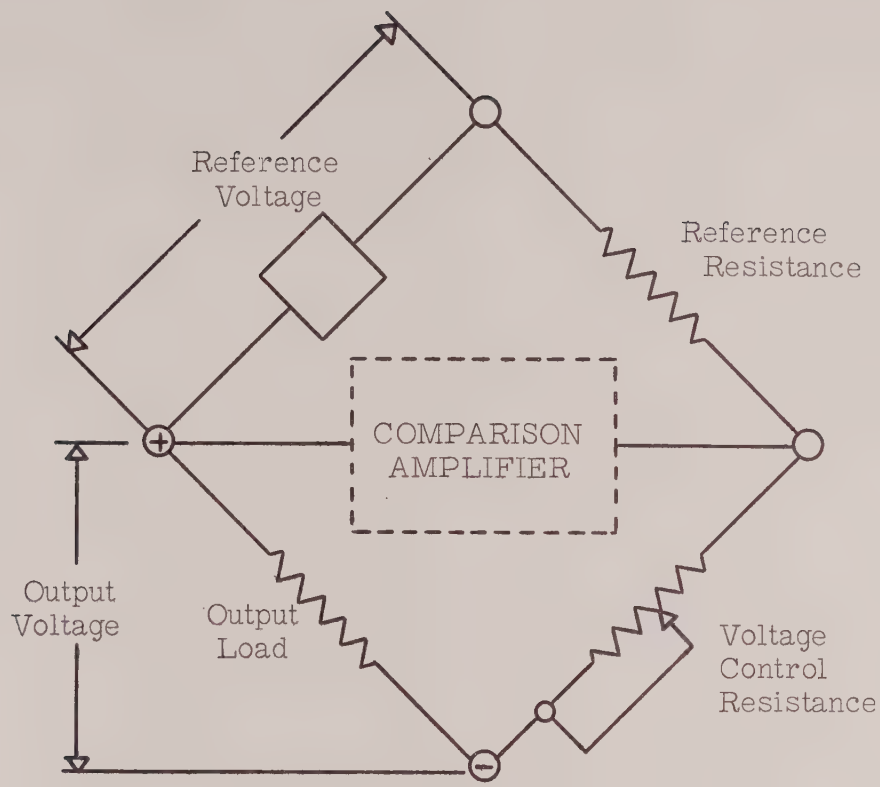



DIAGRAM B-2

.....III. COMPARISON BRIDGE:

(1) This bridge circuit implements the comparison between the OUTPUT VOLTAGE and the REFERENCE VOLTAGE the product of which drives the COMPARISON AMPLIFIER CIRCUITRY*

(2) The COMPARISON BRIDGE is represented schematically in Diagram B-2.

(3) Balance occurs in the COMPARISON BRIDGE when the following ratios are equal:

$$\frac{\text{Output Voltage}}{\text{Voltage Control Resistance}} = \frac{\text{Reference Voltage}}{\text{Reference Resistance}}$$

## SECTION C OPERATING PROCEDURES

### C-1 GENERAL OPERATING INSTRUCTIONS.

.... INSTALLATION.

This Power Supply is shipped without any internal packing material and may be put into operation immediately. Special open mounting for the regulator tubes, at the rear of the chassis, facilitates convection cooling. This unit is designed for standard rack mounting or for bench use; carrying handles are provided on the front panel.

With POWER INPUT switch and DC OUTPUT switch turned OFF, connect the line cord to three-prong receptacle, 115 Volts AC. The third wire (green) in the power cord connects the chassis to the building ground circuit. When using the two-prong receptacle adaptor supplied with the unit, the green pigtail lead must be connected to a suitable ground connection in order to ground the chassis.

.... INITIAL TURN-ON.

Procedure.

(1) The Supply is shipped with jumpers installed between terminals 1 and 2 and between 10 and 11 on the rear terminal strip, and these jumpers should be in place for standard operation. (See Fig. C-1)

(2) With the FINE VOLTAGE control set to approximately mid-position, turn the POWER INPUT switch ON, and allow at least 30 seconds for the filaments to warm up before turning ON the DC OUTPUT.

(3) Turn the VOLTAGE RANGE switch to the output range desired, and set the FINE VOLTAGE control to the desired output voltage.

(4) The output voltage should not be set to values outside the upper and lower specified limits of the voltage band to which the RANGE switch is set.

(5) Once it has been determined in the INITIAL TURN-ON procedure that the unit is operating properly, the output voltage may be left at any desired setting and the DC OUTPUT switch turned OFF and ON without any precaution. This will leave the filaments operating in standby condition. However, if the POWER INPUT is turned OFF, the warm-up sequence should be followed when the SUPPLY is again turned on.

....DC OUTPUT CONNECTIONS. (See Fig. C-1)

The DC Output may be taken from the front panel binding posts or from two terminals on the barrier strip at the rear of the unit. The additional barrier strip terminals are for Ground, AC Input, AC Output and Remote Control circuits.

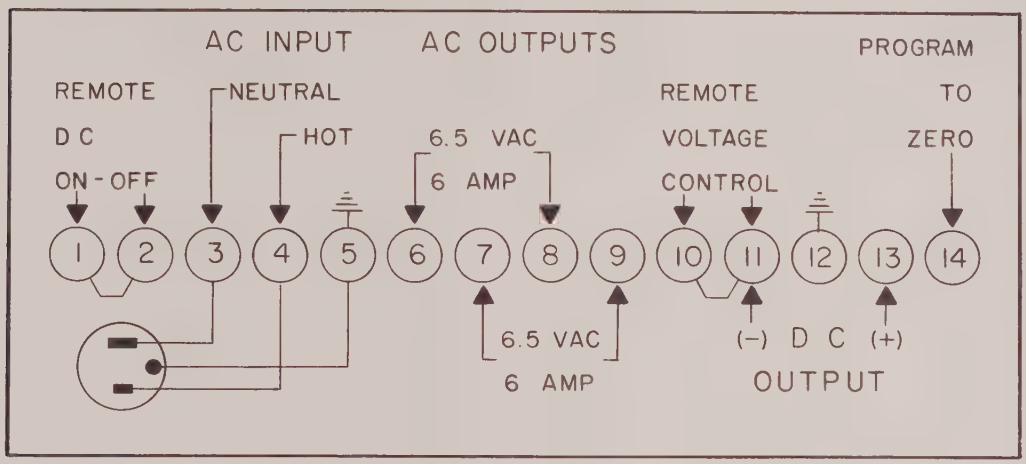



FIG. C-1 TB 201 REAR TERMINAL BOARD

....MAINTENANCE.

Under normal operating conditions, no mechanical maintenance of any kind should be required. Conservatively rated components assure long trouble-free operating life.

Exceptional component accessibility provided by resistor board construction and plug-in sub-assemblies, facilitates servicing should it be required. It is recommended that trouble-shooting be handled by personnel highly familiar with transistor circuitry, preferably with experience in feedback regulator design.

....FACTORY REPAIRS.

If it becomes necessary or desirable to return the equipment to the manufacturer for repair, it should not be shipped to the factory without prior authorization and shipping instructions. The inclusion of detailed information with the unit, or in correspondence prior to its return, will greatly expedite the completion of repair work and return of the equipment to the sender. In any correspondence to the factory about this Power Supply, the model and serial number should always be included.

## .....LOAD CURRENT DERATING CHART
## AS FUNCTION OF VOLTAGE RANGE SWITCH POSITION
## (FOR USE WITH "PROGRAM TO ZERO" OPERATION)

| RANGE SWITCH POSITION | OUTPUT VOLTAGE RANGE | MAXIMUM RATED LOAD CURRENT (MA)* | | |
|---|---|---|---|---|
| | | (1) | (2) | (3) |
| 255-325 V | 255-325 | 600 | 400 | 200 |
| | 195-255 | 420 | 280 | 140 |
| | 130-195 | 340 | 230 | 110 |
| | 70-130 | 290 | 195 | 95 |
| | 0-70 | 255 | 172 | 80 |
| 195-255 V | 195-255 | 600 | 400 | 200 |
| | 130-195 | 450 | 305 | 150 |
| | 70-130 | 370 | 250 | 125 |
| | 0-70 | 300 | 205 | 100 |
| 130-195 V | 130-195 | 600 | 400 | 200 |
| | 70-130 | 490 | 330 | 165 |
| | 0-70 | 390 | 260 | 130 |
| 70-130 V | 70-130 | 600 | 400 | 200 |
| | 0-70 | 525 | 350 | 170 |
| 0-70 | 0-70 | 600 | 400 | 200 |

FOR EXAMPLE:

If it is desired to remotely control the output in the range 100-200V, set voltage range switch to 195-255V position.

When output voltage of unit is remotely set at 200V the maximum safe load current is 600 MA; at 150V maximum safe load current is 450 MA; at 100V the maximum safe load current is 370 MA.

* If unit is adapted to 400 or 200 MA (max.) operation, columns #2 or 3 respectively should be consulted for current derating.

## C-2 SPECIAL OPERATING INSTRUCTIONS.

....AC OUTPUT, EXTERNAL FILAMENT SUPPLY. (See Fig. C-2)

Two AC outputs, 6.5 volts, 6 amperes each, are provided for operation of external system tube filaments. These outputs are unregulated, and are isolated from the DC Output, from ground, and from each other. They may be used singly or connected together in series or parallel, depending on voltage and current requirements. Be sure to observe the jumper connections shown in Fig. C-2 to obtain the proper polarization for series or parallel connection.

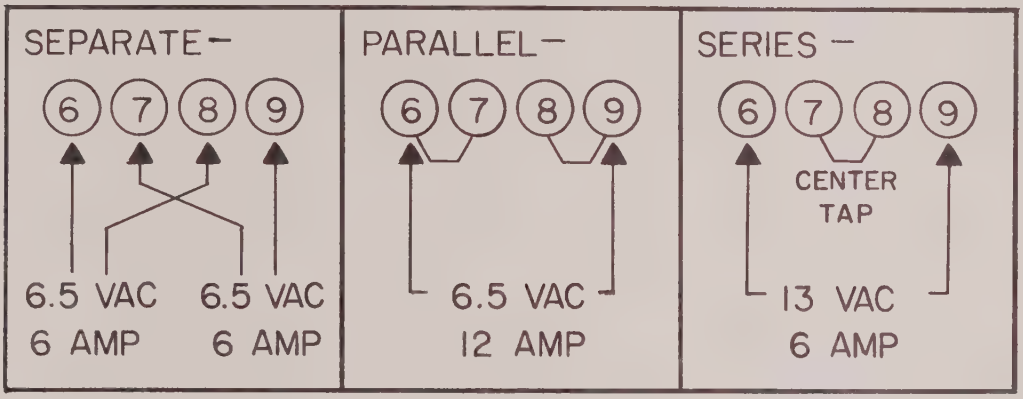



FIG. C-2 A C OUTPUT CONNECTIONS

....REMOTE ON-OFF CONTROL, AC INPUT.

The main AC Power Input to the Supply may be remotely controlled by installing an ON-OFF switch in series with the AC Input connections to the rear terminal board. This switch will operate in series with the front panel Power ON-OFF switch, which must be left ON to control Power ON-OFF remotely. An optional remote pilot light may be installed which will indicate when the AC Input to the Supply is turned ON (front panel and remote switch both turned ON).

Procedure. (See Fig. C-3)

(1) Connect ON-OFF switch (S-1) to terminal 4 in series with AC input (hot).

(2) Connect 115 v ac pilot light to terminals 2 and 4.

(3) With Power Input ON and DC Output OFF, the tube filaments and external filament supplies will remain ON, for standby operation.

## ....REMOTE ON-OFF CONTROL, DC OUTPUT.

With the AC Power Input turned ON in standby condition, remote ON-OFF control of the DC Output may be obtained by connecting an external switch in the input circuit of the Main DC Source transformer. This switch will be in series with the front panel DC Output Switch, which must be left ON to control the DC Output remotely.

Procedure. (See Fig. C-3)

(1) Remove jumper between terminals 1 and 2 on the rear terminal board, and connect ON-OFF switch (S-2) to terminals 1 and 2.

(2) The Power Input should be ON at least 30 seconds before the DC Output is turned ON, to allow filament warm-up.

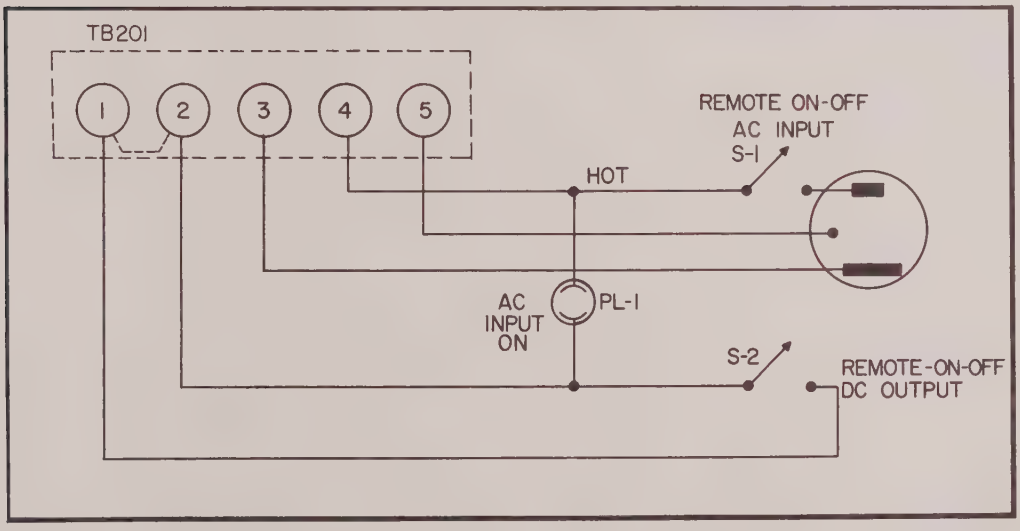



FIG C-3 REMOTE AC INPUT ON-OFF AND DC OUTPUT ON-OFF

## ....REMOTE OUTPUT VOLTAGE CONTROL.

The setting of the output voltage to the desired value may be remotely controlled, within the limits of any one selected output range, by means of an externally connected variable resistance control.

Procedure. (See Fig. C-4)

(1) Set and lock the Voltage Range Switch on the front panel to the voltage band which is to be remote-controlled.

(2) With the DC Output turned ON, set the output voltage to the lower limit of the voltage band selected, using the Fine Voltage Control on the front panel. This control may also be locked to prevent accidental change in its setting.

(3) Provide 100 ohms of Remote Control resistance for each volt desired above the lower limit of the output band selected, up to a maximum voltage not to exceed the upper limit of the selected band.

Example, for full range control in the 255-325 v output band:
a) set the Range Switch to the 255-325 v position.
b) set the output voltage to 255 v with the Fine Control.
c) provide 7K Remote Control resistance (range of volts above lower limit = 70, 70 x 100 Ω = 7K).

(4) Remove the jumper between terminals 10 and 11 on the rear terminal board. Using shielded, twisted pair wire, connect the Remote Control resistance to terminals 10 and 11. Connect the shield to chassis, terminal 12.

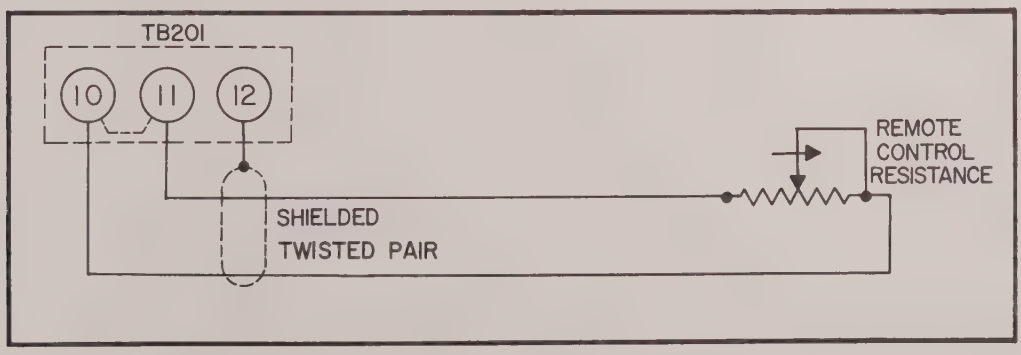



FIG C-4 REMOTE VOLTAGE CONTROL - SINGLE RANGE

## .... OUTPUT VOLTAGE CONTROL, PROGRAMMING TO ZERO.

The setting of the output voltage to the desired value may be controlled over a continuous range greater than the limits of any one output voltage band, without having to switch ranges, by means of an externally connected variable resistance control.

The limits of the overall range to be controlled are chosen according to the requirements of the application, and may be from any lower limit down to 0 volts, to any upper limit, up to the maximum output, 325 volts.

The maximum permissable load current will be less than the maximum rated output of the Supply when using this method of voltage control, depending on the extent of the overall range chosen, and the actual point of operation within that range. The maximum permissable output current with this method of control is given in the Current Derating Table (included in the Instruction Manual for each Model) as a function of the actual operating voltage and the setting of the Voltage Range Switch.

Procedure. (See Fig. C-5)

(1) The jumper between terminals 10 and 11 on the rear terminal board should be disconnected.

(2) Set and lock the Voltage Range Switch on the front panel to the output band that will include the upper voltage limit of the overall range to be controlled.

(3) Provide 100 ohms of Control Resistance for each volt in the overall range to be controlled.

Example: if it is desired to control a range of 0 to 300 volts, a) set the Range Switch to the 255-325 v position; b) provide 30K Control Resistance (total range of volts to be controlled =300 v, 300 x 100 Ω = 30K).

(4) Using shielded, twisted pair wire, connect the Control Resistance to terminals 11 and 14. Connect the shield to chassis, terminal 12.

(5) Check the Reference Current Calibration, as outlined in "VOLTAGE CONTROL-REFERENCE CURRENT CALIBRATION" on page C-7.

(6) Check the Current Derating Table for maximum output current permissable for the intended operating output voltage.

( - PROGRAMMING TO ZERO continued. )

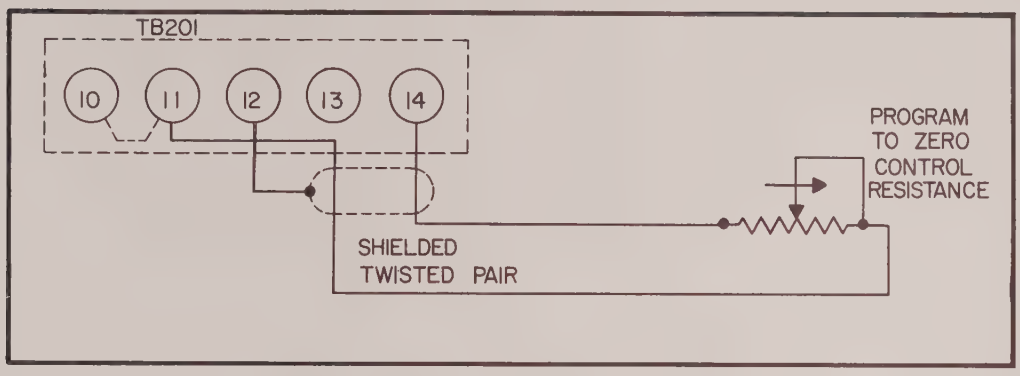



FIG C-5 OUTPUT VOLTAGE CONTROL - PROGRAM TO ZERO

.... VOLTAGE CONTROL - REFERENCE CURRENT CALIBRATION.

The resistance setting of the voltage control adjusts the Output Voltage at a resistance-to-voltage ratio that is determined by the fixed reference current through the voltage control. The reference current is made adjustable by Resistor R-14 in the Control Unit, and is pre-set at the factory to obtain a control resistance to output voltage ratio of approximately 100 ohms per volt (10 ma). When using Remote Voltage Control or Programming to Zero, the ratio of output voltage to control resistance can be calibrated precisely for the control resistor that is being used, by adjusting the reference current.

Procedure.

(1) With the supply set-up properly for Remote Voltage Control or Programming to Zero, adjust R-14 if necessary to obtain the desired Output Voltage for a specific value of Remote Control resistance. The resulting ratio of voltage to resistance will hold over the entire range of the control.

(2) To check the reference current when using the internal Voltage Control, connect a milliameter across terminals 10 and 11 on the rear terminal board (jumper removed, meter + to 10). The current should be 10 ma. (This reading is independent of Output Voltage setting and loading conditions.

(3) R-14 (screwdriver adjustment) is located next to the fuse on the Control Unit assembly, which is accessible by removing the top cover of the unit.

than 50% of $1/R_S$, but that instead, a new value of $R_S$ be used based on the desired lower value of output current.

All of the load current passes through $R_S$ and its wattage rating should be ten times actual dissipation, or greater. The stability of the output will be dependent on the stability of $R_S$, and its recommended temperature co-efficient should be 20 ppm per degree C, or better. The resolution of $R_C$ can be made greater by combining a smaller variable resistance with a fixed resistor.

Procedure. (See Fig. C-6)

(1) Remove jumper between terminals 10 and 11.

(2) Connect $R_S$ between the + DC Output terminal and the load. Connect $R_C$ between the Program to Zero terminal (14) and the junction of $R_S$ and the load.

(3) Set the Voltage Range Switch to the proper output voltage band position; set $R_C$ to maximum.

(4) With the DC Output turned ON, adjust $R_C$ to obtain the desired output current. $R_C$ may require additional resetting until operating stability is reached.

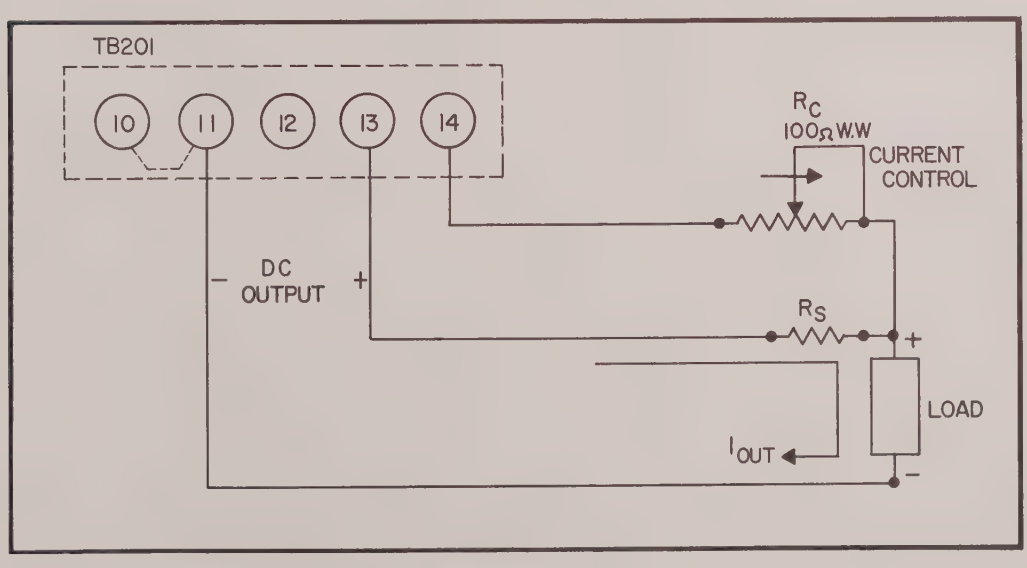
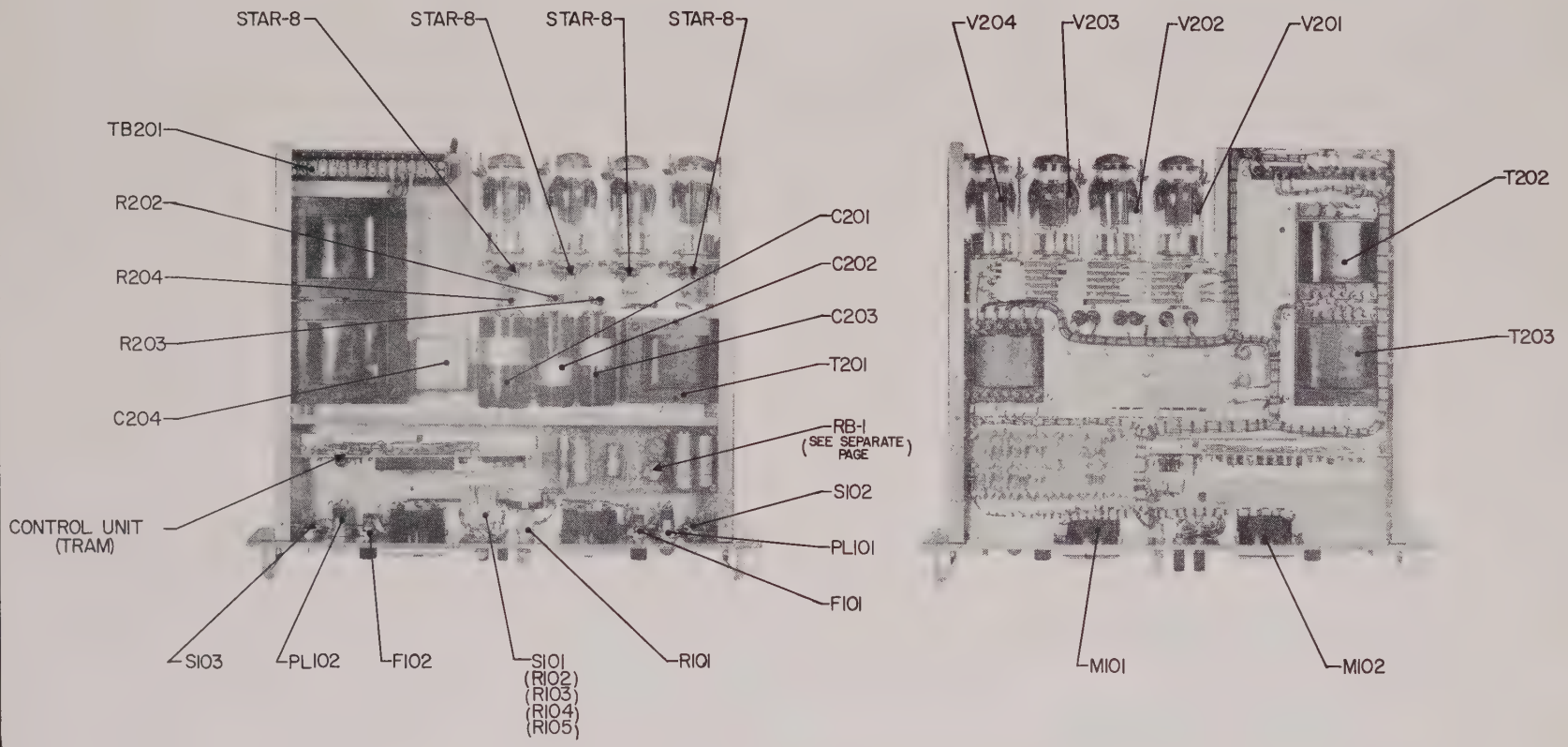



FIG C-6 CURRENT REGULATED OPERATION

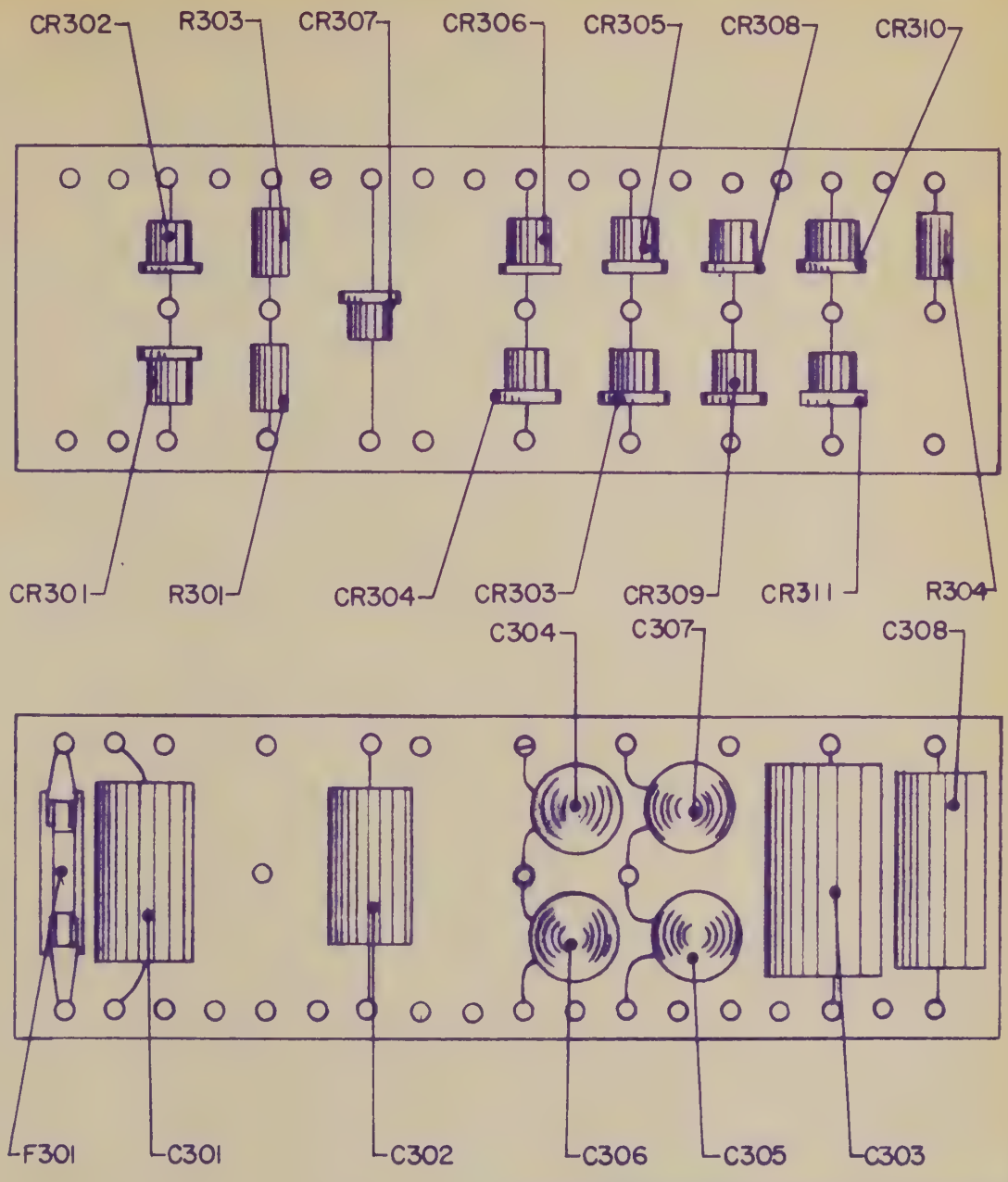
| Schematic Part No. | Kepco Part No. | Description | Specifications | Mfr. | Mfr's. No. |
|---|---|---|---|---|---|
| | | Capacitors: | | | |
| C201 | 117-0148 | Electrolytic, Pigtail Type | 40 µf 450 v + 50, -10% | Industrial Cond. | 40B805 |
| C202, 203 | 117-0206 | Electrolytic, Can Type | 150 µf 300 v + 50, -10% | Industrial Cond. | 30B270RRB |
| C204 | 117-0219 | Paper, Can Type | 2 µf 400 v 10% | Industrial Cond. | 2421BAB |
| C301 | 117-0122 | Electrolytic, Pigtail Type | 100 µf 50 v +100, -10% | Industrial Cond. | 1B1070 |
| C302 | 117-0147 | Electrolytic, Pigtail Type | 10 µf 150 v + 50, -10% | Industrial Cond. | 10B912RM |
| C303 | 117-0148 | Electrolytic, Pigtail Type | 40 µf 450 v + 50, -10% | Industrial Cond. | 40B805 |
| C304-307 | 117-0090 | Ceramic | 0.01 µf 1000 v 20% | Good-All | GAE29103M10 |
| C308 | 117-0072 | Mylar | 0.1 µf 1600 v 20% | Good-All | 620S104016W |
| | | Rectifiers: | | | |
| CR301, 302 | 124-0084 | Silicon, Pigtail Type | | Transitron | SL-91 |
| CR303-306 | 124-0083 | Silicon, Pigtail Type | | Columbus Elec. | CEC-7050 |
| CR307-311 | 124-0028 | Silicon, Pigtail Type | | Automatic Mfg. | PT-5 |
| F101 | 141-0027 | Fuse, Slow Blow | 0.8 a 250 v | Bussmann | MDL-8/10 |
| F102 | 141-0025 | Fuse, Slow Blow | 7 a 125 v | Bussmann | MDX-7 |
| F301 | 141-0030 | Fuse, Slow Blow | 2 a 250 v | Bussman | MDX-2 |
| PL101, 102 | 153-0024 | Pilot Light, Neon | | Gen. Electric | NE-51 |

| Schematic Part No. | Kepco Part No. | Description | Specifications | Mfr. | Mfr's. No. |
|---|---|---|---|---|---|
| | | Resistors: | | | |
| R101 | 115-0954 | Variable, Wire Wound | 10 k Ω 3 w 10% | Clarostat | A58-10K-HVC |
| R102-105 | 115-0922 | Fixed, Power, Axial | 6 k Ω 5 w 5% | Ward Leonard | 5X6000 |
| R202, 203 | 115-0228 | Fixed, Molded | 82 k Ω 2 w 10% | Allen-Bradley | HB8231 |
| R204 | 115-1026 | Fixed, Power, Strip | 30 k Ω 20 w 5% | Ward Leonard | 20S30000 |
| R205 | 115-0707 | Fixed, Power, Tubular | 20 Ω 10 w 5% | Ohmite | 1008 |
| R301 | 115-0255 | Fixed, Molded | 56 k Ω 1/2 w 5% | Allen-Bradley | EB5635 |
| R303 | 115-0547 | Fixed, Molded | 1 k Ω 1/2 w 10% | Allen-Bradley | EB1021 |
| R304 | 115-0718 | Fixed, Molded | 47 Ω 1/2 w 10% | Allen-Bradley | EB4701 |
| S101 | 127-0113 | Switch, Rotary | 2 Pole 5 Pos. | Trolex | 212-1746-2 |
| S102, 103 | 127-0012 | Switch, Toggle | SPST | Cutler-Hammer | 7501-K13 |
| T201 | 100-1170 | Transformer | | Kepco Magnetics | 100-1170 |
| T202, 203 | 100-1196 | Transformer | | Kepco Magnetics | 100-1196 |
| V201-204 | 126-0083 | Vacuum Tube | | Tung-Sol | 6L6GC or 6550 |
| Star-8 | 112-0008 | PASS TUBE SOCKET ASS'Y (4 required) | | | |
| | | Includes the following: | | | |
| 1 ea. | 115-0859 | Resistor, fixed, molded | 20 Ω 2 w 5% | Allen-Bradley | HB2005 |
| 1 ea. | 115-0183 | Resistor, fixed, molded | 560 Ω 1 w 10% | Allen-Bradley | GB5611 |
| 1 ea. | 115-0858 | Resistor, power, axial | 4.5 k Ω 5 w 5% | Ward Leonard | 5X4500 |

| Schematic Part No. | Kepco Part No. | Description | Specifications | Mfr. | Mfr's. No. |
|---|---|---|---|---|---|
| | | Capacitors: | | | |
| C1 | 117-0105 | Electrolytic, Pigtail Type | 25 µf 25 v +100, -10% | Industrial Cond. | 1B1063 |
| C2, 3 | 117-0128 | Mylar | 0.4 µf 200 v 10% | Hopkins Eng. | P42MK |
| CR1, 2 | 124-0084 | Rectifier, Silicon, Pigtail Type | | Transitron | SL-91 |
| F1 | 141-0023 | Fuse, Slow Blow | 0.3 a 250 v | Bussmann | MDL-3/10 |
| Q1, 3 | 119-0022 | Transistor, PNP | | Tung-Sol | 2N382 |
| Q2, 4 | 119-0024 | Transistor, NPN | | Gen. Transistor | GT1092 |
| Q5 | 119-0020 | Transistor, PNP | | RCA | 2N398 |
| | | Resistors: | | | |
| R1 | 115-0572 | Fixed, Molded | 330 Ω 1 w 5% | Allen-Bradley | GB3315 |
| R2 | 115-0871 | Fixed, Molded | 680 Ω 1/2 w 5% | Allen-Bradley | EB6815 |
| R3 | 115-0872 | Fixed, Molded | 270 Ω 2 w 5% | Allen-Bradley | HB2715 |
| R4 | 115-0273 | Fixed, Molded | 68k Ω 1/2 w 5% | Allen-Bradley | EB6835 |
| R5 | 115-0783 | Fixed, Molded | 300 Ω 1/2 w 5% | Allen-Bradley | EB3015 |
| R6 | 115-0626 | Fixed, Molded | 100 Ω 1/2 w 10% | Allen-Bradley | EB1011 |
| R7 | 115-0502 | Fixed, Molded | 10 Ω 1/2 w 10% | Allen-Bradley | EB1001 |
| R8 | 115-0903 | Fixed, Molded | 120 Ω 1/2 w 5% | Allen-Bradley | EB1215 |
| R9 | 115-0489 | Fixed, Molded | 10k Ω 1/2 w 10% | Allen-Bradley | EB1031 |
| R10 | 115-0444 | Fixed, Power, Axial | 300 Ω 3 w 5% | Ward Leonard | 3X300 |
| R11 | 115-0862 | Fixed, Power, Axial | 600 Ω 3 w 5% | Ward Leonard | 3X600 |
| R12 | 115-0439 | Fixed, Molded | 3.3k Ω 1/2 w 10% | Allen-Bradley | EB3321 |
| R13 | 115-0857 | Fixed, Molded | 6.8k Ω 1/2 w 10% | Allen-Bradley | EB6821 |
| R14 | 115-0863 | Variable, Multiturn | 200 Ω 1/4 w 5% | Bourns | 271-1-201 |
| R15 | 115-0940 | Fixed, Molded | 51 Ω 1/2 w 5% | Allen-Bradley | EB5105 |
| RD1 | 121-0014 | Reference Diode | | U. S. Semcor | SZ6.8 |

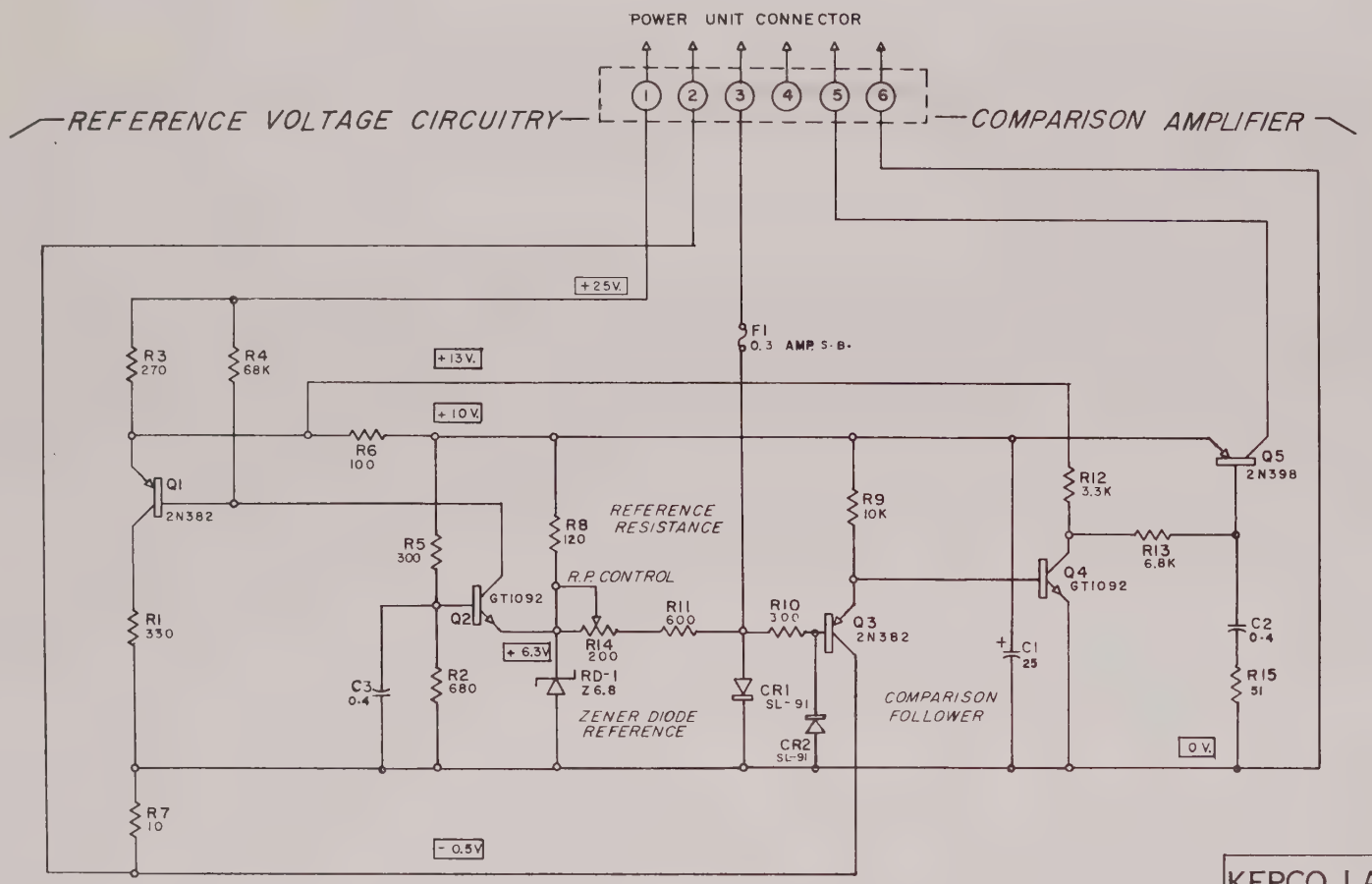



| KEPCO LABORATORIES | |
|---|---|
| FLUSHING | NEW YORK |
| ITEM: POWER UNIT | DES 3-13-61 |
| MODEL HB-6 | APP'D J. Byrnes |
| DWG No CM0 11 05 | DFTM R.C. |
| | CHKD T. Dil |




KEPCO INC.
FLUSHING NEW YORK

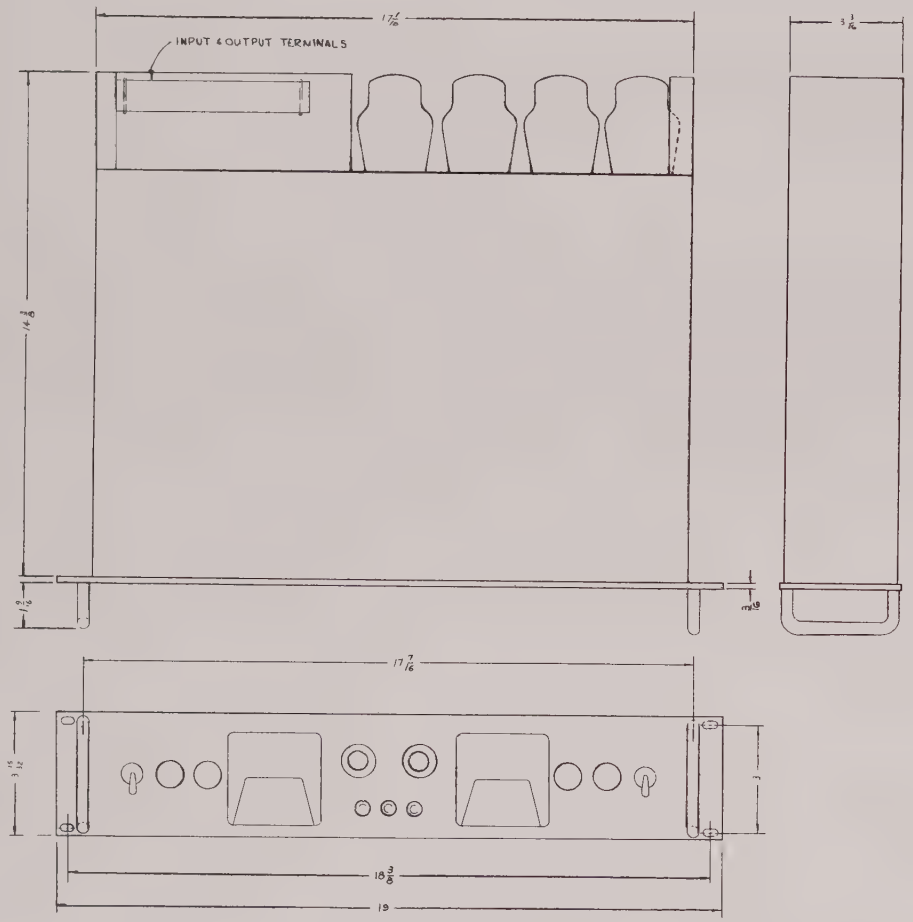
| | |
|---|---|
| ITEM RB-1 | DES 4-13-61 |
| | APPD J Bykes |
| MODEL HB-6, HB-8 | DFTM R.C. |
| DWG. No. AM01106 | CHKD T. Daly |




NOTE:
1. ALL VOLTAGES TAKEN UNDER CONDITIONS SPECIFIED ON MAIN SCHEMATIC.

| KEPCO LABORATORIES | |
|---|---|
| FLUSHING, NEW YORK | |
| ITEM: CONTROL UNIT | DES J.R.G. |
| | APPD 5-2-61 |
| MODEL TRAM-23 | DFTM R.T. |
| DWG. No B-M00997 | CHKD GB |

C - M00016




NOTE:
APPLIES TO THE FOLLOWING MODELS

| | |
|---|---|
| HB-6 | HB-60 |
| HB-4 | HB-40 |
| HB-2 | HB-20 |

TOLERANCE UNLESS OTHERWISE SPECIFIED · FRACTIONS ± 1/64 DECIMALS ± .005 ANGLES ± 1/2°

DEFIANCE NO. 1000H 59619

| KEPCO INC. FLUSHING, N.Y. | | | |
|---|---|---|---|
| TITLE: OUTLINE DRAWING | | | |
| DRAWN: W.P. | CHECKED: J.B. | APPROVED: | DATE: 9-29 53 |
| MODEL NO.: (SEE NOTE) | | PART NO.: | SCALE: HALF |
| DWG. NO. C - M00016 | | | |

E 90

I 400 MILS

R = .4 + 25/300 = 382

# CORRECTION SHEET FOR INSTRUCTION MANUAL

| MATERIAL AFFECTED | CORRECTION |
| --- | --- |
| Power Unit Parts Location Photos CM01105 dated 3-13-61 | Capacitor C201, Capacitor, Electrolytic, Pigtail type, is mounted with Resistor R204 on a resistor board physically located in place shown occupied by Can-type C201. |

Kepco
inc.